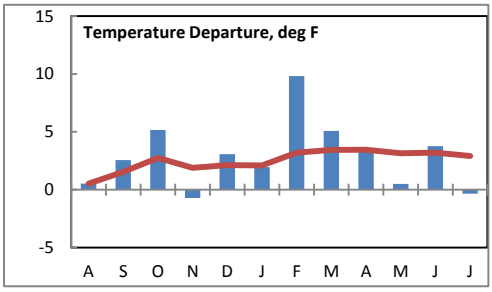
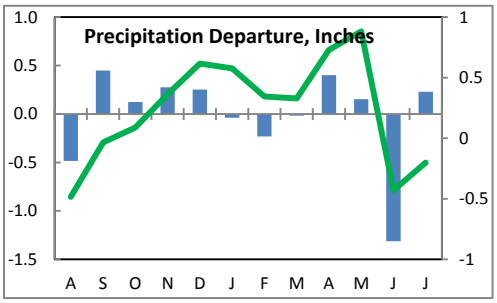
Montana Weather/Precipitation Summary

July 2016 NOAA's National Weather Service Great Falls Montana

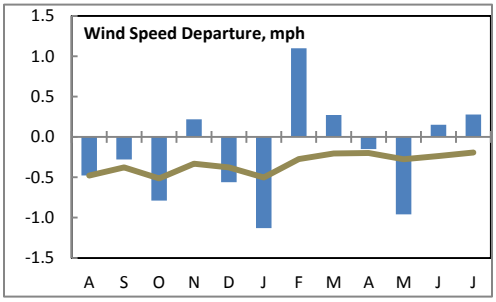
During July, a strong ridge of high pressure was over the central US, and influenced eastern Montana. Meanwhile, an anomalous trough of low pressure was over the Pacific Northwest (Fig. 1). Temperatures were above normal southeast and below normal elsewhere. Precipitation was above normal over central and northeast Montana. July's winds were slightly above the long-term average.

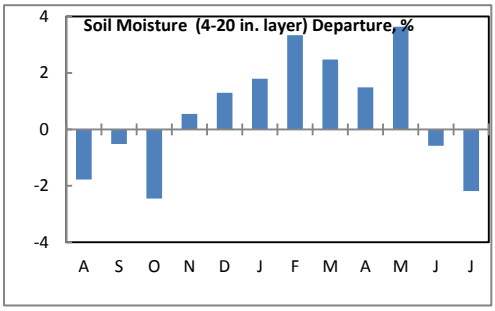


Statewide composite temperatures averaged 0.3°F below normal for the month. The red line on the graph to the right shows the cumulative 12-month departure from normal. The temperature anomalies ranged from -3.5°F at Polson Kerr to +2.3°F at Sonnette (Fig. 2). The warmest average monthly temperature was 76.0°F at Broadus, and the coolest was 50.8°F at Placer Basin SNOTEL. This was the 49th coolest July of record. For the past 12-months, the statewide composite average temperature is 2.9°F above normal. Ten of the last 12 months and 21 of the past 24 months have had warmer than normal temperatures. This is the first July since 2010 to average below normal across the state. The 22°F lowest temperature recorded at Elk Park and Flattop Mountain was the coldest July temperature since 2006, when a value of 20°F was recorded at Clover Meadow.



The monthly departure from normal for precipitation across Montana is shown in Figure 3. Below normal precipitation values covered much of the state, except the central and northeast. The highest rainfall amount recorded was 4.75-inches near Plentywood. Statewide, this month averaged 1.89", or 0.33" above normal. The statewide composite precipitation for the past 12 months is 0.42" above normal. The green line on the graph to the right shows the cumulative 12-month departure from normal. Nine of the past 12 months have measured above normal precipitation. This July's average rainfall was the highest for July since 2009.





The statewide average winds were stronger than normal in July, ranking as the 37th windiest July of record. The statewide composite average was 8.4 mph, 0.3-mph above normal. The brown line of the graph to the right shows the 12-month cumulative statewide wind departure from normal. The 12-month average is running 0.2-mph below average. Only five of the past 12 months have had above normal average speeds. The fastest average speed was 15.0 mph at Deep Creek RAWS. A strong thunderstorm produced gusts to 78 mph north of Havre on the 19th.

Composite statewide soil moisture was below normal for July. The average of 17.8-percent is 2.2 points below the 22-year average of 18.4-percent. This is the fifth lowest July value since 1995.

Refer to NEIC's State of the Climate report for the latest monthly discussion:
http://www.ncdc.noaa.gov/sotc/

July 1-4
Warm conditions prevailed for the first few days of July. Isolated severe weather occurred over eastern Montana. Gusts reached 64 mph at Livingston.

July 5-17
A cooler and unsettled period dominated during this period. Severe thunderstorms produced a tornado near Webster on the 6th, and near Dillon on the 10th (Fig. 4). Wind gusts reached 75 mph at Baker on the sixth and 65 mph on the 10th. A two-day period brought rain amounts over two inches to western Montana ending on the 11th. Finley Point reported 2.6 inches. Severe weather continued over eastern Montana. On the 14th and 15th hail was reported at Glendive and Absarokee. Wind gusts reached 71 mph at Nye. Severe weather on the 17th produced 1 inch hail at Florence.

June 18-31
Mostly above normal temperatures returned for the last days of the month. Scattered severe thunderstorms continued as well, but becoming less common near the end of the month. Smoke from a farm-equipment-caused fire caused visibility to be near ¼-mile in the Great Falls area on the 26th (Fig. 5). A thunderstorm brought 1.5-inches of rain in 90 minutes near Conrad on the 27th, meanwhile another thunderstorm produced 2.5 inches of rain near Circle. Hail to 2.75 inches fell near Pompeys Pillar. A last round of thunderstorms was on the 30th. Golf ball size hail fell at Duck Creek, on Fort Peck. Smoke from fires in the Pacific Northwest spread across the area, and brought hazy skies on the 30th and 31st.

Precipitation/convection

Severe convective weather occurred on 19 days in July. The normal for the state is 12 days. There have been 36 severe weather days for the season, seven above normal.

Water Year
The temperature was 42.8°F or 3.2°F above normal. This has been the warmest water year since 1992 and the 5th warmest of record.
The composite precipitation was 13.34-inches, 0.68" inches above normal. This was the 46th wettest water year to date, and the wettest since 2013.
Winds averaged 8.9 mph, the 17th calmest of record, and 0.2 mph below normal.

July summary information:

High Temperature	106°F at Brandenberg & Powderville (22nd)	**Greatest Precip**	4.81" at Denton (Fergus)
Low Temperature	22°F at Elk Park (7th) and Flattop Mtn (21st)		4.70" at Crystal Lake and Sacajawea SNOTEL
Warmest Ave Temp	76.0°F at Broadus	**Peak Wind Gust**	78 mph near Havre (19th)
Coolest Ave Temp	50.8°F at Placer Basin SNOTEL		
Range of Temp departures	-3.5°F at Polson Kerr to +2.3° at Sonnette	**Highest Ave Wind**	11.6 mph at Sweet Grass 15.0 mph at Deep Creek RAWS
21 city mean monthly Temperature/Normal	67.6/67.9F 0.3F below normal. 49th coolest of record (since 1880). 85th percentile. Oct-Jul 42.8/39.6 3.2F above normal. 5th warmest of record.	**20 city mean monthly wind speed/Normal**	8.4 mph/8.1 mph; 37th windiest of record (since 1936). 46th percentile. Oct-Jul 8.9 mph/9.1 0.2-mph below normal. 17th calmest of record.
22 city mean monthly precipitation/Normal	1.89"/1.56" – 121% of normal. 10th wettest of record (since 1880). 80th percentile. Oct-Jul 13.34"/12.66" - 0.68" above normal. 46th wettest of record.		

Historical Rank of Precipitation (inches)
for the Current Month and Water Year to Date

Location	Jul	% of Norm	Rank	Pcntl	Oct 1 – Jul 31	% of norm	Rank	Pcntl	Years
Baker	3.17	223%			11.43	120%			18
Billings	0.45	35%	66	56	8.53	68%	70	61	115
Belgrade	1.61	144%	21	25	10.53	88%	46	58	79
Butte	0.94	70%	53	43	8.14	78%	93	76	122
Cut Bank	1.46	114%	38	34	9.39	111%	48	44	108
Dillon	0.89	71%	33	42	7.49	87%	39	51	76
Glasgow	3.42	192%	9	7	18.12	191%	3	2	116
Great Falls	1.20	80%	50	39	13.28	113%	40	32	124
Havre	2.43	148%	25	18	14.18	158%	12	8	136
Helena	0.78	66%	66	47	6.98	78%	113	82	137
Jordan	2.04	109%			12.23	119%			18
Kalispell	1.51	104%	28	22	15.19	104%	33	26	122
Lewistown	3.48	180%	13	10	14.12	103%	62	51	120
Livingston	1.39	95%	36	31	11.44	92%	57	51	110
Miles City	1.34	82%	50	36	11.15	107%	61	43	139
Missoula	2.06	200%	12	8	11.31	95%	65	49	131
Mullan Pass	1.60	134%	22	28	44.99	128%	10	12	74
Wolf Point	2.43	123%			12.55	127%			18
Glendive	4.18	222%	11	8	12.40	113%	39	34	114
Sidney	2.24	89%	51	67	11.15	94%	38	49	76
BZN-MSU	1.41	97%	43	31	14.45	86%	81	61	133

Rankings and Percentiles are 1=driest, higher numbers=wetter.
For an automated version of this chart, updated daily, go to
http://www.wrh.noaa.gov/tfx/dx.php?wfo=tfx&type=&loc=products&fx=PCPNTOTALS

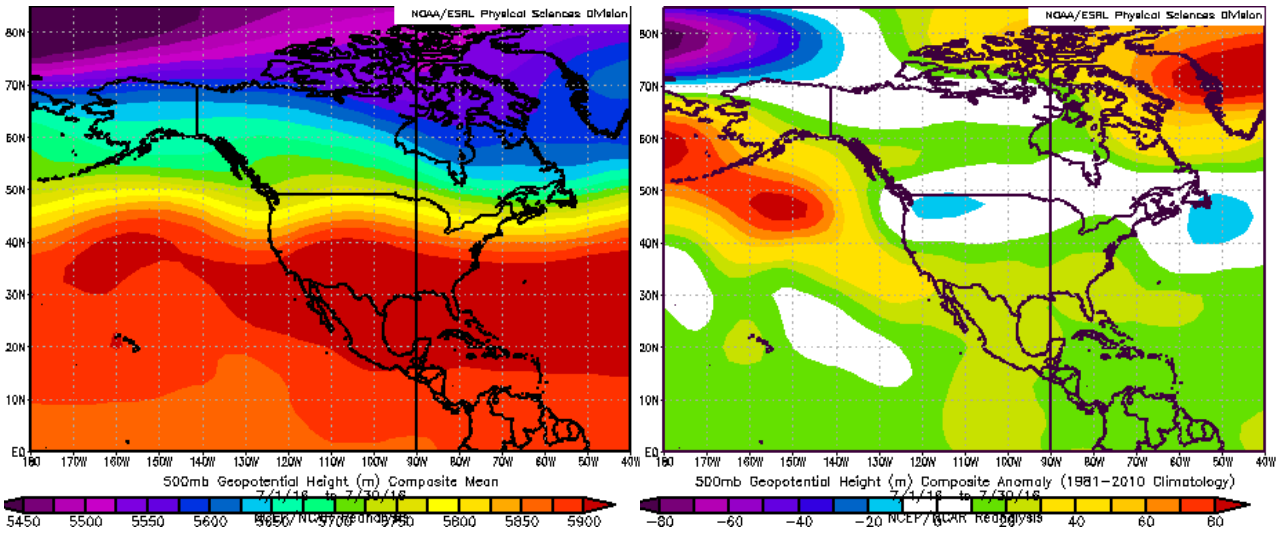


Figure 1. Mean flow at 500 millibars (~18,000 ft) for this month (left) and departure from normal (right).

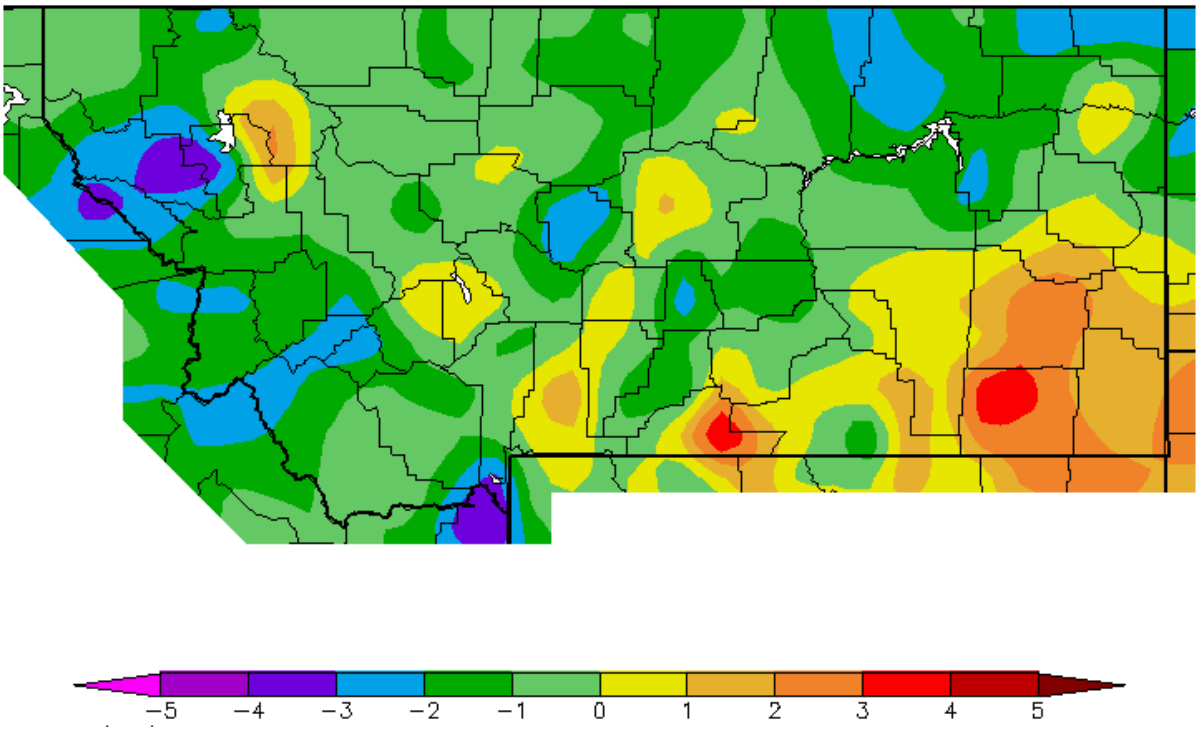


Figure 2. July 2016 temperature departures from normal (°F) (Western Region Climate Center).

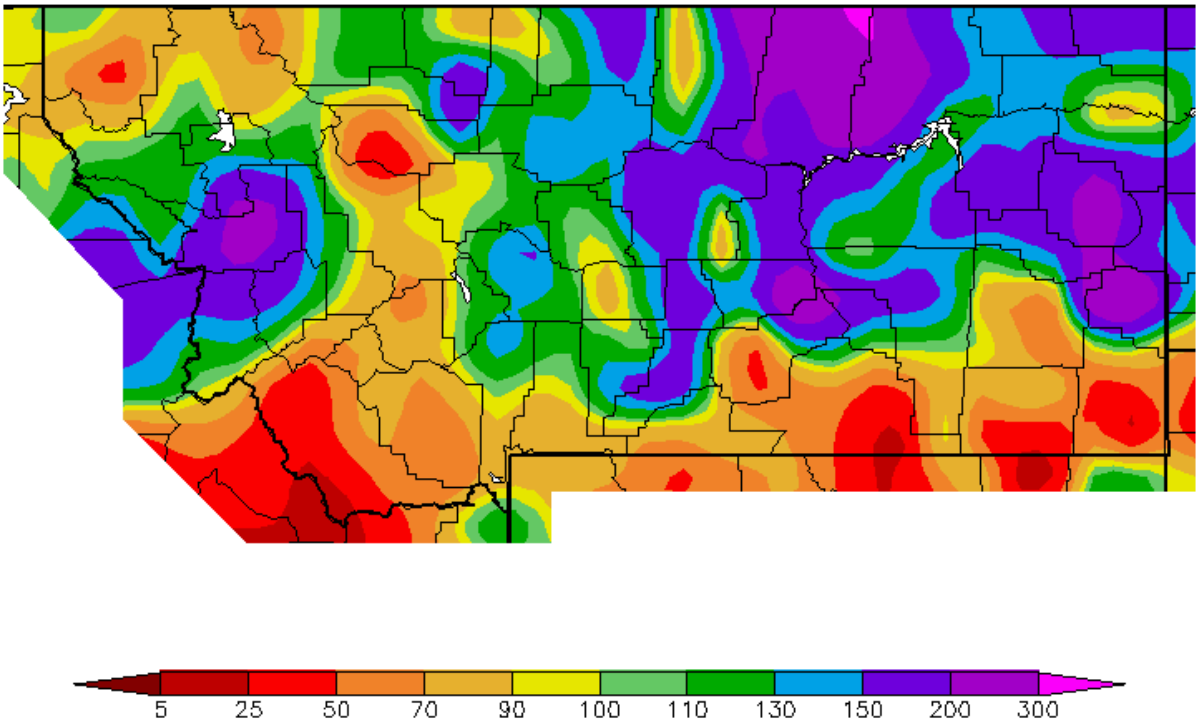


Figure 3. July 2016 precipitation departures from normal (percent) (Western Region Climate Center).

Figure 4. Tornado near Dillon July 10, 2016 (KDBM Dillon)

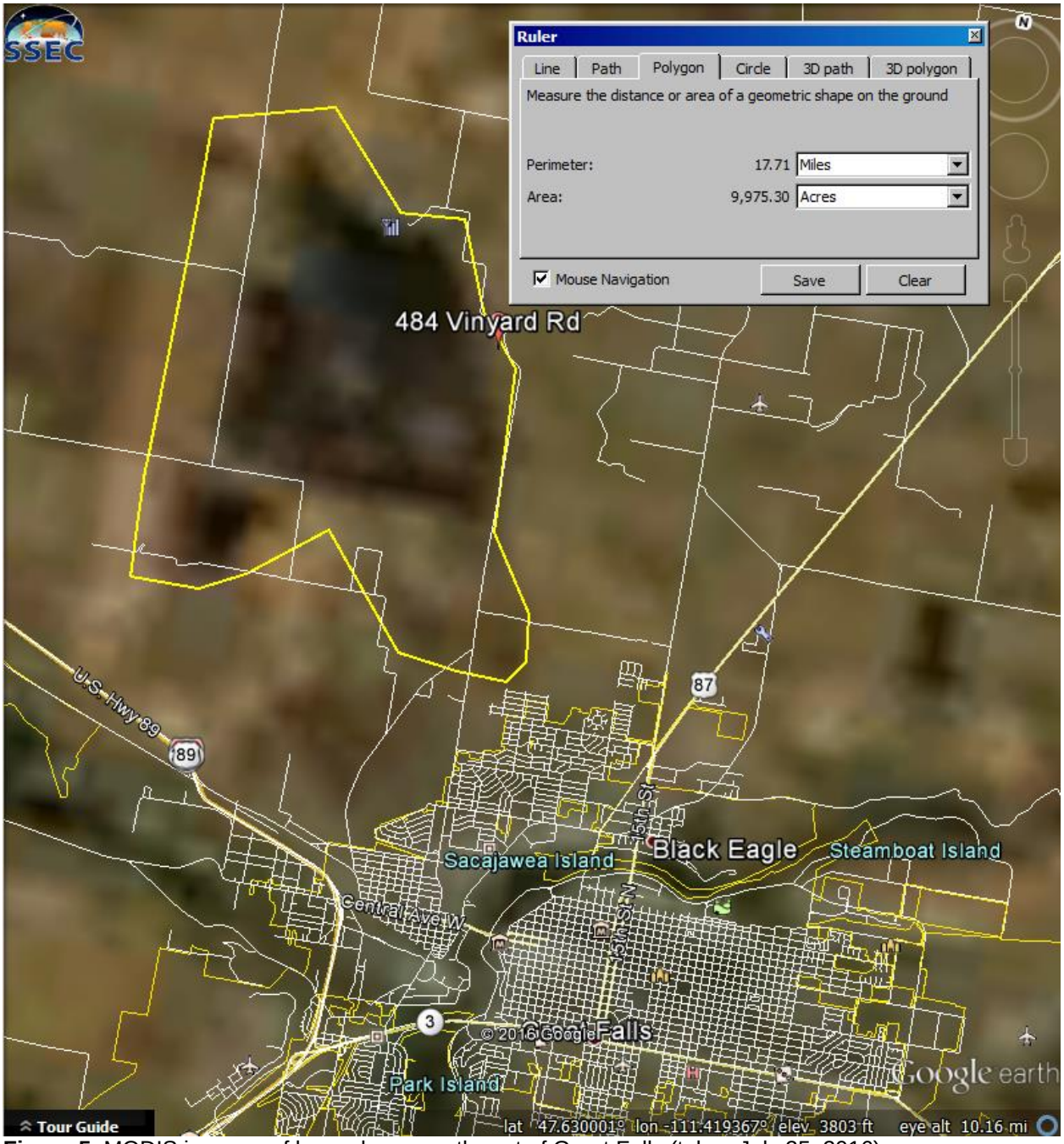


Figure 5. MODIS imagery of burned area northwest of Great Falls (taken July 25, 2016).

For a state map of % of normal water year precipitation (updated around the 7th of each month), go to: http://www.wrh.noaa.gov/tfx/climate/monthlysum/climatesum.php?wfo=tfx

For the latest information on mountain snowpack from the NRCS, go to: http://www3.wcc.nrcs.usda.gov/snow/index.html

For the latest U.S. Drought Monitor, issued weekly by the National Drought Mitigation Center, USDA and NOAA, go to: http://droughtmonitor.unl.edu/

These data are preliminary and have not undergone final QC by NEIC. Therefore, these data are subject to revision. Final and certified climate data can be access at the National Environmental Information Center (NEIC) http://www.ncdc.noaa.gov. Many more links are on the Drought Information Page of the NWS Great Falls web site at http://www.wrh.noaa.gov/tfx/main/drought.php?wfo=tfx. The climatological record for normals is 1981-2010. The ranking period for temperature, precipitation and snowfall is since 1880. The ranking period for wind speeds is since 1936. The ranking period for soil moisture is since 1995.